# Morphology and size of ion induced carbon nanofibers: effect of ion incidence angle, sputtering rate, and temperature

Abstract:

Graphite surfaces were bombarded with oblique Ar + ions at 1 keV to induce the carbon nanofiber (CNF) growth at room temperature and at high temperature (300 °C), and their dependence of length, diameter and number density on ion-incidence angle and sputtering rate was investigated in detail. The sputtered surface ion-irradiated at normal incidence produced huge cones and rod-like structures. It was found that some of the cones possessed the non-aligned thick carbon fibers on the top. By contrast, obliquely ion-irradiation induced the formation of densely distributed CNF-tipped cones. The higher ion-incidence angle produced CNF of smaller diameter and high fabrication temperature favors the formation of longer fiber with higher numerical density. In addition, the number density of the CNF-tipped cones strongly depended upon the ion-incidence angle rather than the sputtering rate. Thus, the diameter, length and number density of CNFs were strongly dependent upon the ion-irradiation parameters. It is believed that myriad of applications is possible with ion-induced CNFs by selecting the suitable ion-irradiation parameters.